CLAIMS

1. A network comprising:

an optical path having a first end and a second end and having a control channel and a data channel;

a scheduler coupled to said optical path, said scheduler operating in accordance with a centrally administered protocol that provisions and regulates data flow on the network and utilizing a dedicated out-of-band control wavelength to broadcast control messages to each of said plurality of nodes in the network;

a plurality of nodes, each of said nodes having a first port coupled to said control channel to receive control messages from said scheduler, a second port coupled to said data channel to receive data messages and a third port coupled to said data channel to transmit data messages, wherein each of the plurality of nodes asynchronously and immediately or after a delay known to both the scheduler and node respond to the control messages as they arrive and wherein said optical path, scheduler and plurality of nodes operative to enable simultaneous transmission and reception of multiple data messages between multiple nodes coupled to said optical path.

2. The network of Claim 1 wherein said optical path corresponds to a unidirectional ring.

3. The network of Claim 2 wherein said unidirectional ring corresponds to a folded-bus unidirectional ring that is optically tapped by each of said plurality of nodes.

4. The network of Claim 3 wherein each of said plurality of nodes both transmit data onto said unidirectional ring and receive data from said unidirectional ring.

5. The network of Claim 1 wherein said scheduler corresponds to a centralized scheduler which arbitrates a medium access protocol which uses an asynchronous, unslotted, tokenless, and collision-free access scheme.

6. The network of Claim 1 wherein in response to one of said plurality of nodes receiving a control message authorizing the node to transmit a signal, the node immediately or after a delay known to both the scheduler and the node transmits on the data channel for the duration specified in the control message.

7. The network of Claim 6 wherein the control message corresponds to a scheduler authorization message (SAM).

8. A medium access (MAC) protocol for a local-area optical wavelength division multiplexed (WDM) network having a scheduler, a control channel coupled to the scheduler, a data channel and a plurality of nodes, each of the plurality of nodes coupled to the control channel and the data channel, the MAC protocol comprising:

transmitting a control packet over the control channel of the WDM network, the control packet specifying a first one of the plurality of nodes in the network as a source node, a second one of the plurality of nodes in the network as a destination node and a value which corresponds to an amount of information which the source node can transmit; and

after transmitting the control packet, waiting a predetermined period of time related to the value specified in the first control packet.

9. The protocol of Claim 8 further comprising:

receiving the control packet at each of the plurality of nodes in the network; and

in response to the source node receiving the control packet, transmitting from the source node onto the data channel an amount of information not greater than the amount specified in the control packet.

10. The protocol of Claim 8 wherein in response to the destination node specified in the control packet receiving the control packet, the destination node monitors the data channel for the bytes following the control packet.

11. The protocol of Claim 9 wherein the destination node specified in the control packet retrieves data from the data channel of the network.

12. The protocol of Claim 8 wherein the amount of information specified in the control packet corresponds to a predetermined number of data packets.

13. The protocol of Claim 8 wherein "immediately or after a delay known to both the scheduler and the node" transmitting information includes immediately or after a delay known to both the scheduler and the node transmitting one or more data packets.

14. The protocol of Claim 8 wherein in response to the node to which the control packet is addressed receiving the control packet, immediately or after a delay known to both the scheduler and the node transmitting no more bytes than are permitted by the control packet.

15. The protocol of Claim 8 wherein receiving the first control packet at each of the plurality of nodes in the network includes passively tapping the control channel at each of the plurality of nodes in the network to receive the first control packet.

16. The protocol of Claim 8 wherein the value in the control packet corresponds to a number of bytes the source node can transmit and the predetermined period of time corresponds to the amount of time required for the source node to transmit the byte-times specified in the control message.

17. The protocol of Claim 14 wherein after waiting for the predetermined period of time dispatching a second control message.

18. The protocol of Claim 15 wherein at least one of the source node and the destination node specified in the second control message is different than the source node and the destination node specified in the first control message.

19. The MAC protocol of Claim 8 wherein the control channel 13 and the data channel 16 are carried by the same fiber and wherein the control messages on the control channel 13 are "out-of-band" from the data on the data channel 16.

20. The MAC protocol of Claim 8 wherein transmitting control packets includes transmitting control packets from a headend of the network.

21. The MAC protocol of Claim 10 wherein transmitting control packets from a headend of the network includes the headend dispatching a scheduler allocation message (SAM).

22. The MAC protocol of Claim 10 wherein the SAM specifies a source node address, a destination node address, and at least one of: (a) the number of bytes the source node may transmit to the destination node; and (b) the amount of time the source node may transmit.

23. A scheduler adapted for use in a network which includes an optical path having a first end and a second end and having a control channel and a data channel and a plurality of nodes coupled to the optical path, said scheduler comprising:

a control message processor for transmitting on the control channel one or more control messages to each of the plurality of nodes, each of the control messages allotting to at least one node a time period corresponding to a data transmission time for a node;

a scheduler timing processor, in communication with said control message processor, said scheduler timing processor for causing said control message processor to wait a period of time corresponding to the allotted data transmission time for a node prior to said control message processor releasing another control message.

24. The scheduler of Claim 23 wherein said a control message processor includes a scheduler authorization message (SAM) processor for transmitting on the control channel one or more SAMs to each of the plurality of nodes.

25. The network of Claim 23 wherein the control and data channels are carried over separate physical media.

26. The network of Claim 23 wherein the individual data channels and control channels are distinguished by one of: wavelength, polarization, coding, timeslots, and spatial division multiplexing over distinct physical media.